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An Essay
on the
Small Pox and Vaccination.
-And the
Causes of the frequent failure
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Latter, as a preventive of the
Former disease.

By William T. Morgan.
Of S. Carolina.

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Nature seems to have intended, as far as can be gathered from history, that great numbers of the human race should be destroyed by contagious diseases. Incalculable has been the mortality from this source in all ages and in every portion of the world, from its first creation down to the present era.

It behoves us therefore to enquire into the facts, appearances, the causes and consequences of such wide wasting plagues. This is the more important as the theory of the old schools has been exploded, the ancient doctrine of fever overturned, and the students are bid to shut their books and learn unwritten lessons at the bed side. It is therefore our duty to think and reason

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for ourselves, and unprejudiced having no favourite theory to support, endeavor to select that mode of treating diseases, which to us appears the most plausible, having reason, and well directed experience for its foundation.

It no doubt is a pleasing reflection, if hereafter we have reason to believe, that we have contributed our mite in removing one of the misfortunes which flesh is heir to; and a desire to do this has ever proved a stimulus to the philosopher and philanthropist to use all their exertions; and every attempt to render the situation of man on earth more happy, deserves to be cherished, tho' it may fail.

One of the first in the catalogue of contagious diseases is the small pox, which with the vaccine matter are the theme of the following thesis. The history and treatment of the former is derived by the perusal of different writers on that disease; the idea whether false or correct, respecting a deterioration of the vaccine matter is with me original.

I commence first with the small pox, and it is a matter of little importance, as regards the

benefit it would confer on mankind, to know certainly where this disease originated. At present the received opinion is that it owes its origin to China, and Hindostan; evidently it was known in those countries at a very remote period. The next account we receive of it is from Arabia when it broke out in the year six hundred and twenty two. From this point as from a centre, it gradually disseminated itself into Europe, and Asia Minor, and reached England, about the close of the ninth century. It is however, the opinion of Doctor Rossdelle, that it existed there long before this period. In the sixteenth century it was carried by the successors of Columbus to America, and the ravages which it committed upon the ignorant and unprotected inhabitants is painful enough to shock the feelings of humanity.

The small pox is by the most systematic writers divided into two forms; the Dissect, and Confluent. Dr. Thomas, makes four divisions, first the febrile, second the eruptive, third the maturative, and fourth the desquamative, or scabbing, which is usually known by

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the name of secondary fest. The symptoms and treatment of the confluent and distinct forms are nearly alike, except in the confluent the symptoms are more violent, and the treatment demanded more energetic.

In either variety, which it may present itself, it is always produced by inhaling air impregnated with the effluvia arising from the bodies of those who are labouring under the disease; or by the introduction of the variolous poison into the system by inoculation.

However this variolous matter is introduced into the system, it generally makes its appearance on the surface in ten or fifteen days, frequently much sooner, but sometimes as late as the twenty fourth day. But when by inoculation, the third day is the time it usually appears.*

The small pox, is preceded by chilliness, redness of the eyes, soreness of the throat, pains in the head back and limbs, lassitude, heat, thirst, nausea, vomiting and quick pulse. In adults there is a great tendency to sweat, which is considered as a favour.

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able symptom of the disease assuming the distinct
type. Epileptic convulsions frequently attend the
commencement of this disease, especially when it makes
its attack upon children, which in those cases, are
looked upon as favourable symptoms; but not so in
adults. Dr. Gregory remarks, 'At an advanced period of
life, early and fierce delirium, affords evidence of
an affection of the brain and nervous system, from
which much is to be dreaded.'

It has been remarked by me well
conversant with this disease, and I do not recollect having
seen it noticed by any other writer, that adults perspire
more during the febrile stage of small pox than
in any other fever, and that exhalation from the
skin has a peculiar odour, which having once been
inspired is not again to be mistaken, being totally
different from that emitted in measles. The eruptive
fever continues for forty eight hours, sometimes as long
as seventy two, and in many cases strongly resembles
common continued fever. The suddenness of the attack

This depression is produced by the puncture made
in the skin when the matter is introduced,
and when it occurs in that form produced
by contagion it should be looked upon as an
unfavourable symptom.

together with the preceding symptoms, connected with the tenderness of the epigastrium upon pressure, will serve to distinguish it.

As soon as the eruption appears on the surface the fever declines, and in a short time goes off, and then all doubt as to the nature of the disease is immediately dispelled. The eruption first comes out like spots produced by flea-bites on the face, head, neck, and wrists, and gradually distributes itself all over the other parts of the surface. The whole eruption is completed in twenty-four, or at furthest forty-eight hours.

On the third day after the eruption breaks out a small vesicle may be observed having a central depression at the summit of eachimple. These vesicles contain a small quantity of transparent lymph. The areola now forms around it, which when the vesicles are numerous produces inflammation in the neighbouring skin, and imparts to it a red colour.

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About the sixth day the vesicles assume a spheroidal form, suppuration has now taken place, and the matter which they contain is of a thick yellow colour. On the eighth day, from the state of the eruption, scabbing commences all over the body, the swelling on the face then subsides, and all fever is at an end. In the course of ten days more the crust fall off, and although the skin for a time remains of a dark brown cast, it ultimately regains its natural colour.

As the eruption advances, the face being thickly beset with pustules, it becomes very much swollen, the eyelids are closed up, so much so as to deprive the patient of sight, and a gentle salivation ensues which about the eleventh day becomes so violent as to be put up with difficulty, but in children a diarrhoea instead of the salivation attends this stage of the disease. When the pustules are very numerous and thickly set on all parts of the surface and the fever more violent the disease is said to be of

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the confluent kind. In the beginning of this variety of the disease there is little difference between it and the distinct; the fever soon becomes higher, and the patient more languid; in a short time this similarity of the two forms vanishes, and on the third or fourth day the change becomes apparent.

The vessels in the face run together so as to form one continuous seat or pustule, which contains instead of the thick yellow pus, a thin brownish ichor; the face becomes pale, the vessels in the extremities are without the areola, are of a dull colour and flaccid. When the pustules break large brown scabs are formed which throw off an intolerable foetor.

At this period violent secondary fever ensues, the action in the skin is still kept up, ulceration of the cutis now progresses under the scabs, and if the patient survives, ulcers are formed, or it leaves hideous abscesses, tedious ulcers of the legs and inflammation of the eyes, which wear out the strength.

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of the patient; and often ultimately destroy him.

Frequently in the distinct, and always in the confluent form, the mucous membrane of the trachea and larynx are affected by a peculiar eruption, which follows a regular course of the disease and has great influence on it; the extent of the eruption on the tongue, is the only index of the degree to which the larynx and trachea are affected.

The vessels in these organs produce hoarseness, difficulty of swallowing, increased secretion of saliva, cough, viscid expectoration, dyspnea, and in children as before remarked diarrhoea, owing to the eruption descending toward the intestinal tube.

When the small pox is marked by these symptoms together with early delirium, sudden subsidence of the eruption, syncope, hemorrhage from the stomach or kidneys, vomiting, convulsions, great determination of blood to the skin, petechial vesicles, gangrene of the extremities, purulent ophthalmia, and erysipelas, the patient seldom survives the tenth

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day, but a favourable termination may be hoped for, when the preceding ^{symptoms} are wanting, the patient possessing a quiet mind, the tongue free from pustules and the pulse small soft and quiescent.

The greatest danger exists from the tenth to the thirteenth day, but in feeble and delicate constitutions, when the disease is accompanied by any determination of blood to the brain, the sequelae is scarcely less formidable, than the violence of its crisis. When small pox terminates fatally, it is usually about the tenth day, the larynx is found highly inflamed, and lined with a membrane, which is covered with a copious dark coloured secretion.

The diseases with which the small pox, in the commencement may be confounded are Rubella or measles and with Variella or chicken pox. In the latter the pustules go back without suppurating, they also appear in crops, and are not converted into pustules, but are pointed and filled with lymph. In the small pox the reverse of these symptoms follow the

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Dissections of those who have died with this distressing malady, shows that a high degree of inflammation had existed in the mucous membrane of the primæ viæ, and heavy venous congestion of the lungs, brain and stomach.

Pustules occur only in those parts to which the atmospheric air has access, as the skin nostrils, bronchia, vagina, and if protracted, the rectum. In France it has been asserted that pustules have been found in the mucous tissue of the intestines, and also in the peritoneum, and Mr. Hastings, of England informs us they are to be found in the mucous surface of the lungs. I think it is impossible for pustules ever to exist in mucous tissue, they want the dermoid covering to confine the pus, and being deficient in this covering the pus is discharged as soon as formed and this is the cause of the ~~seen~~ diarrhoea, which has been before noticed.

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From the distinct form of small pox, except when the eruptive febr is very violent, or when it attacks pregnant women, little danger is to be apprehended, while the confluent even in its mildest form is very hazardous to life.

The mortality in small pox simply confluent, is about three in four, in the violent coherent confluent one in four and it is thought out of every six persons who take the small pox in the natural way one dies.

The local effects of this disease appear to be principally felt in the rete mucosum, but and not infrequently the inflammation dips down into the cutis vera. When minutely examined the pock exhibits a cellular structure, the walls of which are perfectly transparent and lined with a membrane which secretes the fluid. they are distended with. At the bottom of each pock may be observed from the fifth to the eighth day a small slough of the cutis which by some eminent pathologist is considered as a certain sort of genuine small pox, being produced by the peculiar kind of inflammation of this disease.

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be attacked by the small pox, both sexes, and all ages are alike susceptible: even the foetus in utero is liable to be destroyed by this foul disease. Under such circumstances the death of the child is inevitable, a lotion is produced, by which the mother's life is sacrificed. Doctor Potter, in his notes to Gregory's practice shows, that the nearer the term of gestation, the greater is the chance of safety for the mother.

It once was an universally received opinion that one attack of the small pox forever secured the system from a second. But now this belief is with some practitioners entirely thrown aside, cases which are known as secondary small pox, so now and then occur in all ages and in every country where this disease has prevailed. These secondary forms are milder than the primary and induce us to think they want the character of genuine small pox yet in some cases they are more violent.

Then Jenner of England made the discovery of the vaccine vaccine or cowpox; and after the matter had been extensively experimented with, it was thought we then had the means in our power of exterminating this fell destroyer from the earth;

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which had so often devastated it of its forest portion, and
 proved a scourge and pestilence to the whole habitable globe.

Unfortunately for mankind these pleasing dreams have
 vanished, we have been deprived of our only safeguard, vaccination
 has lost much of its former reputation and is often considered
 as inert. Some are so indulgent as to deny that vaccination
 has proved itself to be a sufficient preventive to the progress
 of the small pox; and was still thought to be so, until this
 new disease, the varicella (which by some is considered as only a
 variety of the small pox, by others a disease resulting from the
 combination of the two diseases, small pox and vaccine; the
 latter opinion I think is correct, as it would be impossible
 for two diseases so different in their effects to unite) made
 its appearance in the world.

It is now said, and I believe correctly
 considering the diluted state in which the vaccine
 matter is employed, that it only proves a palliative
 remedy against the varicella, and small pox. I have
 once said some persons to deny the former utility
 of vaccination, and if it has ever been a sufficient

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barrier to the progress of the disease, why is it not met?
 How the small pox changed? I think not, it is the
 same it ever was. But what appears the most
 probable, the vaccine matter, passing from one to
 another has become deteriorated.

In many cases where the vaccine matter has
 been used, years have elapsed since it has been
 taken immediately from the animal, from which
 it derives its name. It has passed from one generation
 to another, and by this means I think it reasonable
 to conclude it has become weakened in its active
 principle, or undergone some other important change.

We know if matter taken from a person labouring
 under the most violent confluent form of small
 pox, and introduced into the arm of another, it
 will produce a much milder disease; this being
 true might we not infer that the vaccine matter
 also becomes milder as it is propagated?

When one is vaccinated with matter fresh from
 the cow, the fever which follows its introduction

Death followed in several cases in that state
in the spring or summer of 1828.

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is much greater, all the succeeding symptoms more violent, and even death has been known to ensue. When
 which was the case in several instances but very lately in Connecticut. After the vaccine matter has gone through several persons, it is milder in all its stages, and seldom subjects the patient to any inconvenience. From these reasons together with the former utility of vaccination, and its present frequent failure, I am induced to conclude, that its preventive principle is lost in much of the matter which we generally meet with. Would that I could say these remarks were the result of experiments faithfully performed, but I confess they are only speculations. 18

The opportunity which would have been pleasing in the extreme, of proving by experiment what I have here advanced, has been denied me.

Living as I do in a small inland town of North Carolina, where an occurrence of the small pox is extremely rare, I am compelled to rely on reason and the experiments made by others.

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It is to be wished that some one who is capable and has a suitable opportunity, would search into the causes of the frequent failure of vaccination, and endeavour to reconstitute this former valuable remedy, and let it not be cast out as altogether useless. During the last winter the small pox was brought by the crew of a vessel to a neighbouring town and the disease soon spread among the inhabitants, and continued with violence for some time. Many of the patients were received into the small pox hospital, and while there confined several children were vaccinated with the genuine matter, and then sent to the infected wards, where they remained with the patients then confined, and were not attacked by the disease.

The treatment of the small pox for a long time was confined in charity, consequently the mode adopted greatly increased the mortality.

Stimulating drinks, great abundance of hot clothes, opium, hot air, and many other means, which

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were erroneously thought would promote the discharge of the skin were employed.

In the milder distinct form little medical aid is required, but in the more violent & confluent unfortunately for mankind, all medical resources too often prove unavailing. The small pox like other cutaneous eruptions and most diseases produced by malarial miasmata, has its seat in the stomach; some would locate it in the lungs. These latter organs become secondarily affected. In the commencement of the disease, there is much nausea, which is quickly relieved by an emetic, which disburdens the stomach of its load, renders it better able to combat the disease, determines to the skin, facilitates the appearance of the eruptions; and so soon as this is accomplished, all gastric uneasiness is removed.

Therefore when called to a patient, whose symptoms induces us to think he is attacked by the small pox first administer an emetic, provided arterial excitement does not forbid it, and should this be

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the case the emetic is to be preceded by vomitatives.
 Tartarized antimony continued with Ipecac. is the emetic
 I would prefer.

Small pox, depends upon a specific contagium,
 and in spite of all our efforts will run its course; stop it
 we cannot, but like the pilot in the storm, who is consci-
 ous he does not possess the power of him who guided the
 hurricane sea by speaking peace and was obeyed, aided by
 his ~~his~~ shield guide his bark to some safe haven. So
 it is with the physician who knows he cannot arrest
 this disease, aids by his knowledge conduct his patient
 to a safe crisis.

During the eruptive stage the leading
 indications, are to reduce the inflammatory excitement
 and lessen the quantity of the eruptions. The first is
 met by vomitatives and if the skin is hot and dry
 attended with much fever and chills there be any
 marks of determination of blood to the brain, or ~~or~~
 the general may be assisted by local bleeding to
 lessen the quantity of the eruptions, purge freely the

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surface with cold water, expose the patient to a cool atmosphere, give cold acid drinks, and confine him to the lightest vegetable diet. Sydenham remarks the patient is either quite constive, or has few stools through the whole course of the disease, and he directs the bowels to be kept open by the saline laxatives, and in the interim of the purging, give diaphoretics, or small doses of antimony, or what may answer better James Fowcote's

Not unfrequently the small pox assumes the typhoid form, which is characterised by a sinking of the vessels, or when they rise are only filled with a thin watery bloody serum; under such circumstances, depletion in any shape is not to be thought of, but the system is to be supported by wine, bark camphor and the East ammonia. If the typhoid symptoms still continue the strongest stimulants must be resorted to. Attention must in this stage be paid to the bowels, ^{which} must be kept open by injections, but purging is to be strictly avoided. The convulsions which frequently attack children in the early stage of this disease, are to be

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relieved by the warm bath, and exposure to the cool air. Should they return again, Heat and if necessary apply blisters to the neck, and sinapisms to the extremities.

If the eruption is tardy in its appearance, the emetics and diaphoretics have failed in producing it, we must then rely on the warm bath to be repeated pro re nata. Should passive hemorrhage occur, the Ipecacuanha has been highly recommended.

The throat is to be frequently washed with some astringent gargle, into the composition of which camphor enters. Great attention should be paid to the ease and comfort of the patient. Cleanliness and cool air must be strictly adhered to, and all heating or stimulating articles of food, or drink, strenuously avoided. As soon as the pustules mature, they are to be opened, the matter evacuated and immediately wiped off.

I have now concluded my remarks on the small pox, it would have been easy to have continued much longer, but I have endeavored to be as concise as

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the subject would admit. Would that I could now add
 that the accumulated proofs of the utility of vaccination,
 had occasioned its universal adoption, and finally
 should we be convinced, that this remedy, which has
 so often supported our hopes, when the small pox has
 extensively prevailed is now entirely useless, we hope
 and trust, that He who provides our ^{means} ~~resources~~, and
 directs them in their application, will reveal to us
 another ~~more~~ safe and sufficient remedy.